



WESTERN AUSTRALIAN ECHINODERMS

BY

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In the two papers which follow (Crinoids, by A. H. Clark, and Echinoderms, by H. L. Clark) will be found descriptions of most of the Echinoderms in the Western Australian Museum. To prevent any misunderstanding it seems necessary to mention the circumstances under which the papers were written.

During June, 1912, the F.I.S. *Endeavour* was engaged in trawling operations off the Western Australian coast between Fremantle and Geraldton, and the Director obtained permission from the Federal authorities for the writer to accompany her on two of her trips to obtain specimens for this Museum.

Perhaps the most striking feature of the hauls made by the *Endeavour* was the very large number of Crinoids which were brought up on many occasions. In number of individuals they surpassed all the other groups of Echinoderms put together. In view of the fact that Mr. Austin H. Clark, of Washington, had recently published a paper on the Crinoids of Australia, the collection was sent to him for identification, and his report on this collection constitutes the first of the papers which follow.

In the meantime, Mr. H. Lyman Clark, of Harvard, had offered to determine the Echinoderms already in the Museum, and the remainder of the Echinoderms including all those obtained by the *Endeavour*, except the Crinoids, were therefore sent to him. A few species which had been named by the authorities of the Australian Museum in Sydney, and a few of the *Endeavour* specimens of the same species, together with some Crinoids which had previously been identified by Mr. A. H. Clark, along with those collected by the Hamburg Expedition, were not sent away.

In the introduction to his paper dealing with this material Mr. Clark drew a number of conclusions as to the relative proportions

in which the different orders were represented in Western Australian waters. As, however, the numbers he used were vitiated by the assumption that he had the whole of the Museum collection before him, with his permission the numbers have been removed from the paper as written by him and the true totals set out in this place.

It seems better to consider the collection in two portions. The first of these has been slowly accumulating for a number of years and is composed of specimens found on the shore in various parts of the State and on the reefs of the Abrolhos Islands. Excluding specimens too imperfect for complete identification, 46 species are represented distributed among the different classes thus: Crinoids 7, Asteroids 16, Ophiurans 2, Echini 15, Holothurians 6.

The second portion of the collection consists of the specimens trawled by the *Endeavour* in depths varying from 19 to 120 fathoms, on the slope of the Continental shelf; most of these come from a depth of more than 50 fathoms. It contains 36 species distributed thus: Crinoids 12, Asteroids 7, Ophiurans 10, Echini 7. Only 7 species are represented in both portions of the collection.

It is doubtful whether these numbers give a true idea of the real proportions in which the classes occur in Western Australian waters. The first portion of the collection is evidently a selected one, the larger and more striking Echini and Asteroids predominate. Holothurians have a commercial interest, whilst some of the Crinoids are very beautifully coloured. The Ophiurans, which are mostly small and fragile, do not appeal to the ordinary individual for any of these reasons and are unrepresented.

The collection which was made on board the *Endeavour* probably approximates much more closely to the true proportions existing amongst the forms found in deeper water, on a sandy bottom, though it is probable that here again the larger forms predominate unduly, as a trawl is not the best instrument with which to collect small and fragile specimens.

The following table will give an idea of the comparison between these collections and that made by the *Thetis* on the coast of New South Wales.

	Collection in W.A. Museum.	<i>Endeavour</i> Collection from W. Australia.	<i>Thetis</i> Collection from New South Wales	Percentage of recent Species known in each Class
Crinoids ...	7	12	3	11
Asteroids ...	16	7	9	25
Ophiurans ...	2	10	18	34
Echini ...	15	7	15	12
Holothurians	6	—	8	18
Totals ...	46	36	53	100

As far as they go these figures seem to prove that on both the Western and Eastern coasts of Australia Echini are unusually numerous, while the number of Crinoids found in Western Australia is a long way above the normal.

A list of all the identified Echinoderms in the Museum, with their localities when known, is attached. In addition to the sources already referred to, Dr. Michaelsen has presented a number of Ophiurans and Crinoids collected in this State by the Hamburg Expedition in 1905. These are included in the list.

[The Classification followed is that of Bronn's "Tier-reichs" for all the groups except the Crinoids. The later class are arranged according to Mr. A. H. Clark's Monograph of the Recent Crinoids of Australia.]

WESTERN AUSTRALIAN ECHINODERMATA

IN THE WESTERN AUSTRALIAN MUSEUM.

Class CRINOIDEA (SEA LILIES, FEATHER STARS). Order COMATULIDA.

Family COMASTERIDAE.

<i>Capillaster sentosa</i> , Carp.	Between Fremantle and Geraldton.
<i>Capillaster multiradiata</i> , Linn.	" " "
<i>Comatulella brachiolata</i> , Lamk.	" " "
<i>Comatula purpurea</i> , Müll.	" " "
<i>Comatula solaris</i> , Lamk.	_____
<i>Comanthus alternans</i> , Carp.	Abrolhos Islands.
<i>Comanthus belli</i> , Carp.	Port Hedland.
<i>Comanthus annulata</i> , Bell,	Between Fremantle and Geraldton.
<i>Comanthus parvicirra</i> , Müll.	" " "
<i>Comanthus polycnemis</i> , A. H. Clark	_____

Family ZYGOMETRIDAE.

<i>Zygometra elegans</i> , Bell.	Between Fremantle and Geraldton.
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Family HIMEROMETRIDAE.

<i>Amphimetra discoidea</i> , A. H. Clark.	Between Fremantle and Geraldton
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Family MARIAMETRIDAE.

<i>Dichrometra gyges</i> , Bell.	Inner Bar, Shark Bay.
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Family TRIPIOMETRIDAE.

<i>Tropiometra afra</i> , Hartl.	Between Fremantle and Geraldton.
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Family CALOMETRIDAE.

<i>Neometra gorgonia</i> , A. H. Clark.	Between Fremantle and Geraldton.
<i>Neometra conaminis</i> , A. H. Clark.	" " "

Family THALASSOMETRIDAE.

<i>Ptilometra macronema</i> , Müll.	Off Geraldton.
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Class ASTEROIDEA (STAR FISHES.)

Order PHANEROZONIA.

Family ASTROPECTINIDAE.

- Astropecten triseriatus*, Müll & Trosch. Garden Island.
Lindiamaculata, Müll & Trosch. Between Fremantle and Geraldton.

Family PENTAGONASTERIDAE.

- Pentagonaster stibarius*, H. L. Clark. Between Fremantle and Geraldton.
Tosia australis, Gray. Fremantle.
Iconaster longimanus, Möbius Broome.
Nectria ocellifera, Lamk. Between Fremantle and Geraldton.
Stellaster inaei, Gray. Carnac Island. Between Fremantle and Geraldton.
Stellaster megaloprepes, H. L. Clark. Port Hedland.

Family ANTHENEIDAE.

- Anthenea tuberculosa*, Gray. _____

Family PENTACEROTIDAE.

- Oreaster gracilis*, Lütken. _____
Oreaster nodulosus, Perrier. _____
Culcitaster anamesus, H. L. Clark. _____

Family ASTERINIDAE.

- Nepanthia brevis*, Perrier. Fremantle, Cottesloe.
Anseropoda rosacea, Lamk. Port Hedland.
Asterina gunnii, Gray. Fremantle, Cottesloe.

Order CRYPTOZONIA.

Family LINCKIIDAE.

- Linckia tyloplax*, H. L. Clark. Between Fremantle and Geraldton.

Family ECHINASTERIDAE.

- Echinaster arcystatus*, H. L. Clark. Between Fremantle and Geraldton.
Echinaster purpureus, Gray. Fremantle, Broome.
Echinaster vestitus, Perrier? Port Hedland.
Plectaster decanus, Müll & Trosch. Albany.

Family ASTERIIDAE.

- Asterias polyplax*, Müll & Trosch. Between Fremantle and Geraldton.
Asterias calamaria, Gray.
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Class OPHIUROIDEA (BRITTLE STARS).

Order ZYGOPHIURAE.

Family OPHIODERMATIDAE.

- Pectinura discryta*, H. L. Clark. Between Fremantle and Geraldton.

Family AMPHIURIDAE.

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| <i>Ophiactis savignyi</i> , M.T. | Freycinet Estuary, Shark Bay. |
| <i>Amphiura constricta</i> , Lym. | Champion Bay, Geraldton. |
| <i>Amphiura squamata</i> , Chiaje. | Oyster Harbour, Albany. |

Family OPHIACANTHIDAE.

- Ophiacantha clavigera*, Kochler. Koombana Bay, Bunbury.

Family OPHIOCOMIDAE.

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| <i>Ophiocoma brevipes</i> , Peters. | Shark Bay. |
| <i>Clavigera wendti</i> , M.T. | Shark Bay. |

Family OPHIOTRICHIDAE.

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| <i>Ophiothrix stelligera</i> , Lym. | Cockburn Sound, Fremantle.
Between Fremantle and Geraldton. |
| <i>Ophiethrix spongicola</i> , Stimpson. | Between Fremantle and Geraldton. |
| <i>Ophiethrix hirsuta</i> , M.T. | Freycinet Reach, Shark Bay. |
| <i>Ophiethrix longipeda</i> , Lamk. | Abrolhos Islands. |
| <i>Ophiethrix hartmeyeri</i> , Kochler. | Sunday Island, Shark Bay. |
| <i>Ophiethela danae</i> , Verrill. | Surf Point, Shark Bay. |

Order STREPTOPHIURAE.

Family OPHIOMYXIDAE.

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| <i>Ophiomyxa australis</i> , Lütke. | Between Fremantle and Geraldton. |
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Order CLADOPHIURAE.

Family ASTROPHYTIDAE.

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| <i>Astrogymnotes catasticta</i> , H. L.
Clark. | Off Jurien Bay. |
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<i>Ophiocreas melambaphes</i> , H. L.	
Clark.	Off Jurien Bay.
<i>Ophiocreas rhabdotum</i> , H. L.	
Clark.	Off Jurien Bay.
<i>Conocladus microcomus</i> , H. L.	
Clark.	Between Fremantle and Geraldton.
<i>Astroboa ernae</i> , Död.	Off Geraldton.
<i>Euryale aspera</i> , Lamk.	Off Geraldton.

Class ECHINOIDEA (SEA URCHINS).

Order CIDAROIDA.

Family CIDARIDAE.

<i>Tretocidaris bracteata</i> , A. Ag.	Between Fremantle and Geraldton.
<i>Goniocidaris tubaria</i> , Lamk.	„ „ „
<i>Phyllacanthus annulifera</i> , Lamk.	Port Hedland.
<i>Phyllacanthus magnificus</i> , H. L.	
Clark.	Between Fremantle and Geraldton.

Order DIADEMATOIDA.

Family DIADEMATIDAE.

<i>Centrostephanus tenuispinus</i> , H.	
L. Clark.	Between Fremantle and Geraldton.

Family TEMNOPLEURIDAE.

<i>Salmacis alexandri</i> , Bell.	Off Geraldton.
<i>Salmacis sphaeroides</i> , Linn.	Port Hedland.
<i>Salmacis bicolor</i> , Ag.	_____
<i>Amblypneustes griseus</i> , Blainv.	Fremantle.
<i>Amblypneustes grandis</i> , H. L.	
Clark.	Between Fremantle and Geraldton.
<i>Holopneustes porosissimus</i> , Ag.	Fremantle.
<i>Holopneustes purpureus</i> , A. Ag.	_____

Family ECHINOMETRIDAE.

<i>Helicoidaris armigera</i> , A. Ag.	Fremantle, Cottesloe.
<i>Helicoidaris erythrogramma</i> , Val.	_____
<i>Echinometra mathaei</i> , Blainv.	_____

Order CLYPEASTROIDA.

Family CLYPEASTRIDAE.

Clypeaster telurus, H. L. Clark. Between Fremantle and Geraldton.

Family LAGANIDAE.

Laganum peroni, Ag. Swan River.

Peronella aphnostina, H. L.

Clark. Carnac Island.

Order SPATANGOIDA.

Family SPATANGIDAE.

Linthia australis, Gray. Fremantle, Cottesloe.

Echinocardium australe, Gray. Safety Bay.

Breynia australasiae, Leach. Abrolhos Islands, Broome.

Class HOLOTHURIOIDEA (SEA CUCUMBERS,
BECHE-DE-MER).

Order ACTINOPODA.

Family ASPIDOCHIROTAE.

Actinopyga miliaris, Q. & G. _____

Holothuria atra, Jaeger. _____

Family DENDROCHIROTAE.

Colochirus axiologus, H. L. Clark. Port Hedland.

Colochirus quadrangularis, Less. _____

Colochirus tuberculosus, Q. & G. _____

Family MOLPADIIDAE.

Caudina tetrapora, H. L. Clark. Cottesloe Beach.